

Installation and operating instructions

KEMPER Backflow Preventer BA Figure 361



1. Prerequisites for installation



Install the backflow preventer in frost-free areas only!
Comply with standards:



DIN EN 1717, DIN 1988
DIN EN 12056, DIN 1986-100



Provide a drain line!



Comply with the direction of flow!

Application area

According to DIN EN 1717, in order to maintain flawless functioning of the BA backflow preventer, a flanged dirt trap must be installed in the direction of flow before the BA backflow preventer. Type BA backflow preventers that accord with DIN EN 12729 are used to secure drinking water plants against back pressures and siphon back flow. Fluids up to and including Fluid Category 4 as per DIN EN 1717/1988-100 are secured. They can be used for residential buildings, industrial and commercial purposes with consideration of their specifications. Normally (normal functioning with pressure fluctuations), the vent hole of the middle pressure chamber only allows a few drops through. During malfunctions, the vent hole can allow the full volume flow of the service pipe through. For that reason, dimension the wastewater connection to be sufficiently large according to DIN EN 12056 and DIN 1986-100. Assume the volume flow that could arise through the service pipe on the backflow preventer BA (pay attention to the nominal flow rate!). The backflow preventer BA can secure the following hazard potential in accordance with the Fluid Category:

Category 4 (applies to backflow preventer BA)

Fluids that present a health hazard to humans due to the presence of one or more toxic or highly toxic substances or one or more radioactive, mutagenic or carcinogenic substances.

The higher the classification, the greater the risk potential. For each category, DIN EN 1717 stipulates specific protection valves. The Backflow Preventer BA, Figure 361 is approved without restriction for use up to and including Category 4. A continual bacterial risk (Fluid Category 5) in extant piping systems must not exist.

2. Operating principle

The KEMPER BA Backflow Preventer is subdivided into 3 zones. In Zone 1, the pressure is higher than in Zone 2 and there again higher than in Zone 3. A drain valve is connected to Zone 2, which opens latest when the pressure difference between Zones 1 and 2 has decreased to less than 0.14 bar. The water from Zone 2 flows outdoors. That precludes the risk of back-pressure or siphon back flow in the supply network. The pipeline is interrupted and the drinking water network is protected. Intermittent dripping from the BA Backflow Preventer at the drain valve is not necessarily a malfunction. Under such circumstances, the BA Backflow Preventer separates as intended!

Note:

Do not connect any fast-closing valves or stopping equipment before or after the valve.

Fast closing, e.g. of solenoid valves or ball valves on devices and machines can lead to serious malfunctions in the backflow preventer BA. For that reason, always use slowly closing valves or drives that close slowly.

If the inlet-side static system pressure is high, it is recommended to install a pressure reducing valve in the supply line.

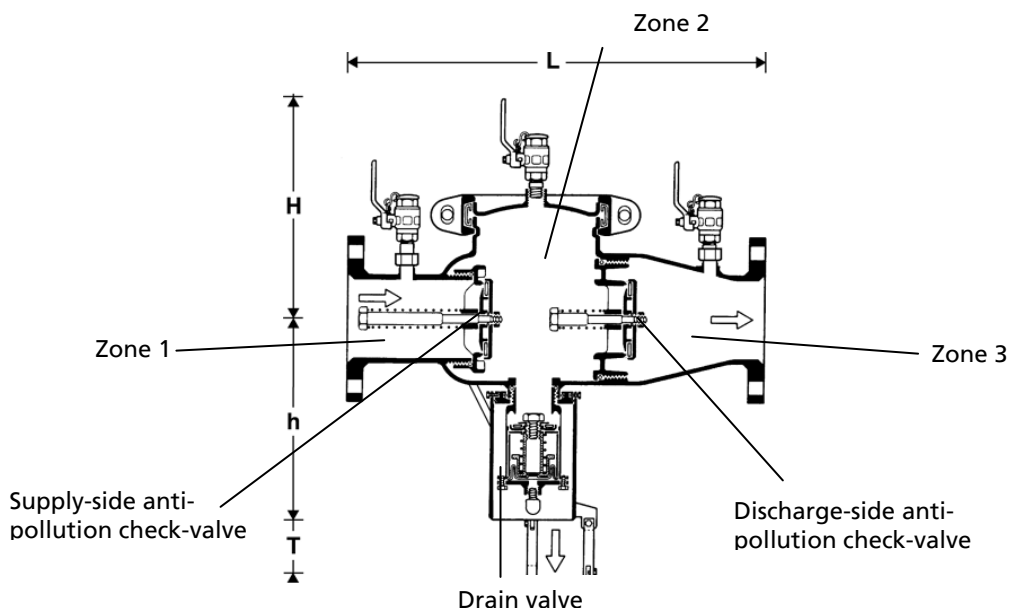


Figure 1: Sectional view

Dimension					
Nominal width	DN	65	80	100	150
Installation height (H)	mm	245	245	245	285
Installation height (h)	mm	270	270	300	300
Installation depth (D)	mm	60	60	60	60
Length (L)	mm	559	559	559	695
Nominal flow at delta p=1 bar	m ³ /h	45	54	85	191
Weight	kg	31.3	32.6	34	52.6

Table 1: Dimensions: Backflow Preventer BA Figure 361

3. Installation

The BA Backflow Preventer must be installed level. Provide cut-off valves in front of and behind the backflow preventer. In addition, a dirt trap must be connected upstream which prevents the backflow preventer from damage and functional impairments due to coarse dirt.

Install the backflow preventer free of tension and without flexural moment as follows:

1. Thoroughly rinse connecting pipe
2. Check connections on backflow preventer for cleanliness (Figure 2)
3. Install backflow preventer as in Figure 3. While doing so, comply with the following points and those in Chapter 3.1:
 - Flow in direction of arrow
 - Maintain installation clearances
 - Make sure there is good accessibility
 - Make drain lines without any tight bends and keep them short. Connection dimension acc Table 2
 - Install the drain line so that the drain connection and the drain valve can be removed for inspection.
 - A material-steady zone of 5 x DN after the BA is recommended

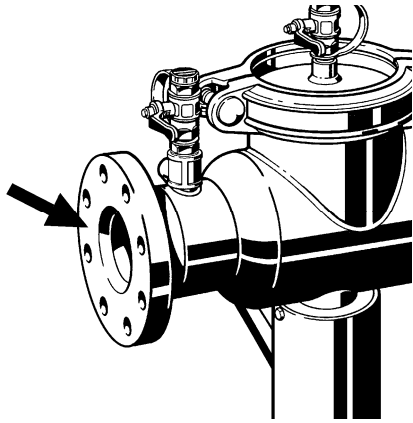


Figure 2:
Connection area

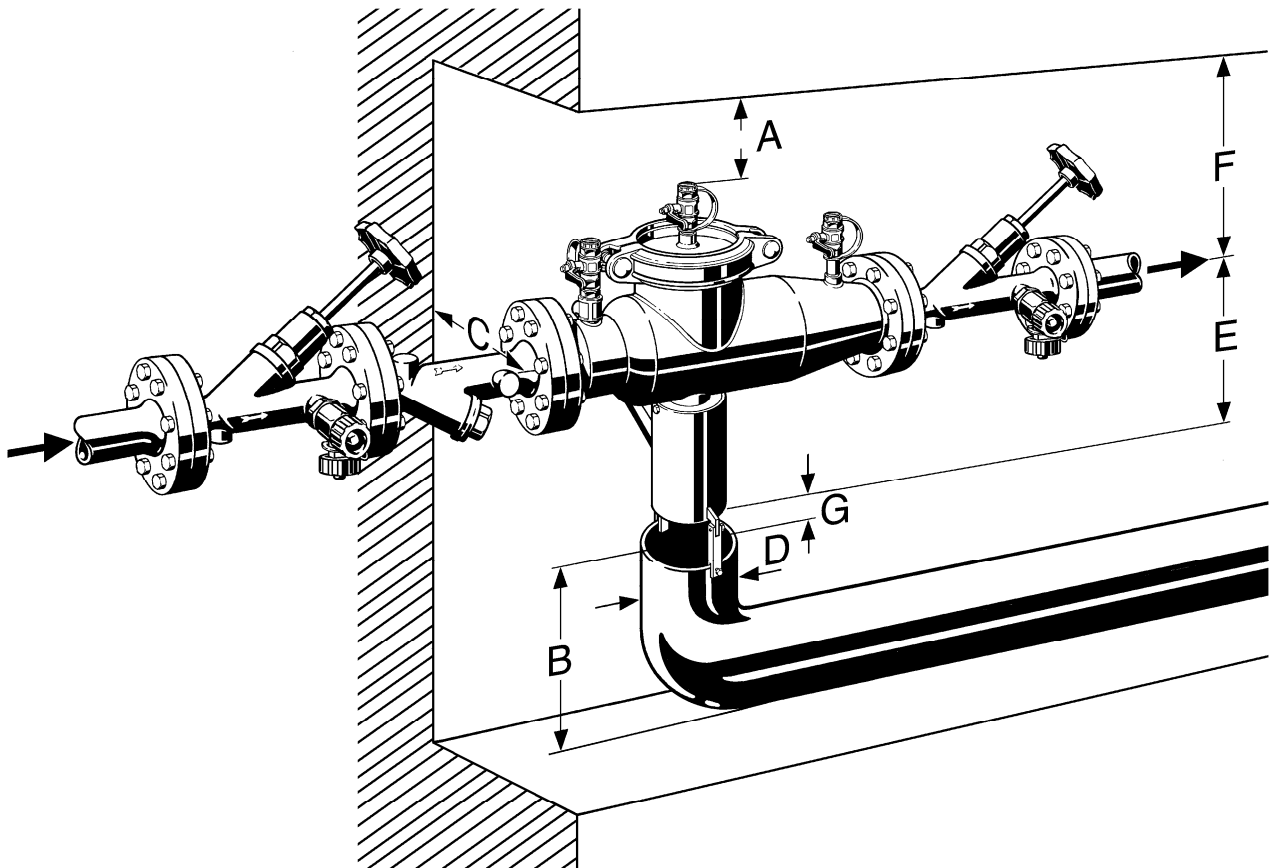


Figure 3: BA Backflow Preventer protection device with installation prerequisites and dimensions.

Connection sizes	65	80	100	150
A	650	650	650	650
B	600	600	600	600
C	160	160	160	200
D	150	150	150	150
E	345	345	345	375
F	895	895	895	935
G	75	75	75	75

(Dimensions in mm)

Table 2: Dimensions for installation prerequisites

3.1 Notes for secure installation

- If there are supply pressure fluctuations, without water removal a short triggering of the drain valve can occur. For that reason, we recommend installing a pressure reducing valve before the backflow preventer.
- The room in which the backflow preventer is installed must be freely accessible at all times and always be frost free. Ensure good ventilation.
- If the drain line is also being used by other equipment/plants, it must be correspondingly dimensioned (pump stations/sewage system)
- No additional, unprotected drinking water connections are permitted after the backflow preventer.
- Within the downstream system, the individual connections are not secured from each other against backflow. If required, provide individual protection.
- The backflow preventer must be easily accessible at all times. Manometer connections and controls must not be obstructed.
- While installing backflow preventers, make sure the water that leaks during the separation process is safely drained off. Installation in shafts and rooms endangered by flooding is prohibited. For inspection and maintenance reasons, provide cut-off valves in the direction of flow before and after the backflow preventer.
- The backflow preventer must be installed flood proof.
- Provide the drain valve control with an effective safeguard, i.e., in case of failure, the vent hole opens completely. In this case, for 1 bar pressure in the middle chamber, calculate with the following dimensions. Dimension the dewatering line correspondingly.

Hydraulic values				
DN	65	80	100	150
m³/h	35	35	35	35

Table 3: Drain lines (sewage system connection dimensioning)

4. Commissioning

Commission the backflow preventer in this sequence:

1. Slowly open cut-off valves 1 and 2.
 - During this process, it is possible the drain valve opens intermittently.
2. Vent the system through ball valves 3, 4, and 5.
 - Open each ball valve until water comes out. It is important to open every ball valve to make sure that all chambers are vented.
3. The backflow preventer is ready for operation.

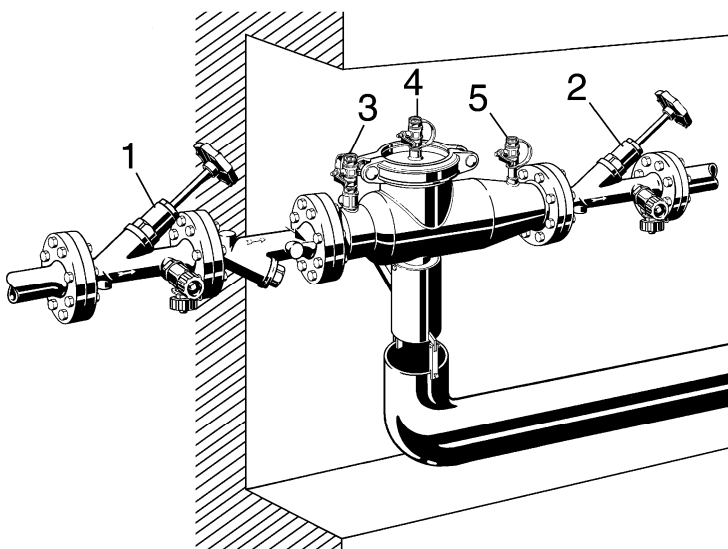


Figure 4:
Commissioning the BA Backflow Preventer
safeguards

5. Inspection

In compliance with standards on drinking water protection and hygiene regulations, the user/operating organisation is given the following specifications:

As per DIN EN 1717, Point 4.6, perform regularly scheduled maintenance on the safeguards. As per DIN EN 806-5 1 x annual maintenance is applicable Europe-wide. Check their proper functioning in regularly scheduled intervals in compliance with the national or regional stipulations.

For DE, in accordance with DVGW W 570-1 (April 2007) under 4.7 it is stipulated that the maintenance must be performed 1 x annually.

For CH, perform the maintenance/inspection as per SVGW W3 Supplement 1 (2000), W/TPW 126 (April 1994) and W/TPW 135 (April 1994). In W/TPW 135, in Point 3 Maintenance, the maintenance/inspection is stipulated as periodical, but at least every 2 years. W/TPW 126 requires the backflow preventer BA to be checked for the first time after the first year of operation. In addition, Offprint no. 1377 of SVGW 8/96 is pointed out.

For NL, in VEWIN Waterwerkblad WB 1.4 G (November 2005 under Point 4 it is stipulated that backflow preventers BA need to be checked for proper operation and maintained 1x annually.

The following applies:

The functional and maintenance measures cover the function test, visual inspection of the interior parts and the cleaning or replacement of the functioning parts as stated under Points 3 and 4 in the operating instructions.

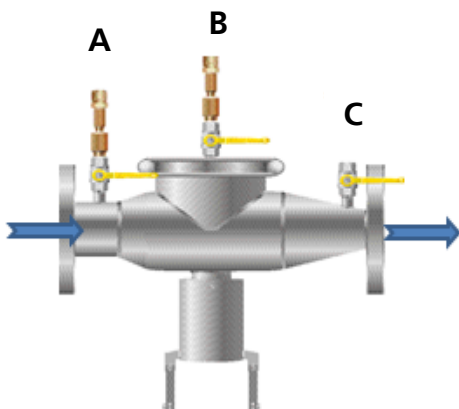
This inspection should also include the related valves. Only authorised specialists are allowed to perform maintenance. Document the inspection on the attached control plate with date and signature. In addition, Appendix 1 on inspection and maintenance is recommended. Put the Backflow preventer BA cartridge through a visual inspection in the installed state during every maintenance to the extent this is possible through the housing opening. The manufacturer recommends replacing the cartridge every 10 years. Comply with local regulations.

Measuring instrument for differential pressure measurement: Suitable differential pressure manometer; The KEMPER differential pressure measurement case, Figure 360 99, is recommended.



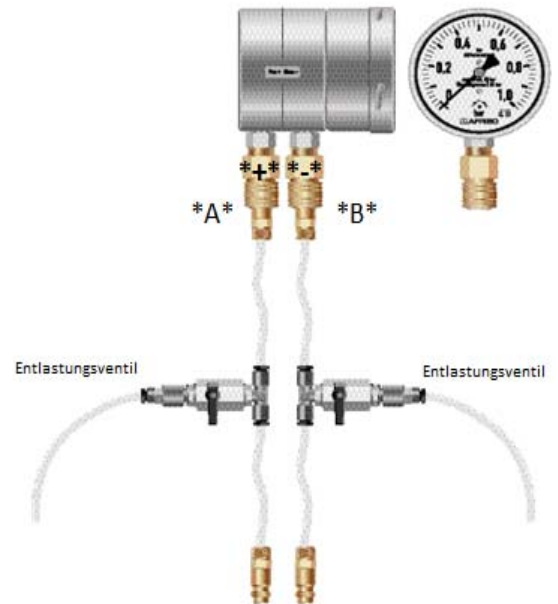
5.1 Connect test adapter

- Screw on adapter G1/2-G1/4
- Screw on adapter G1/4 with plug-on coupling



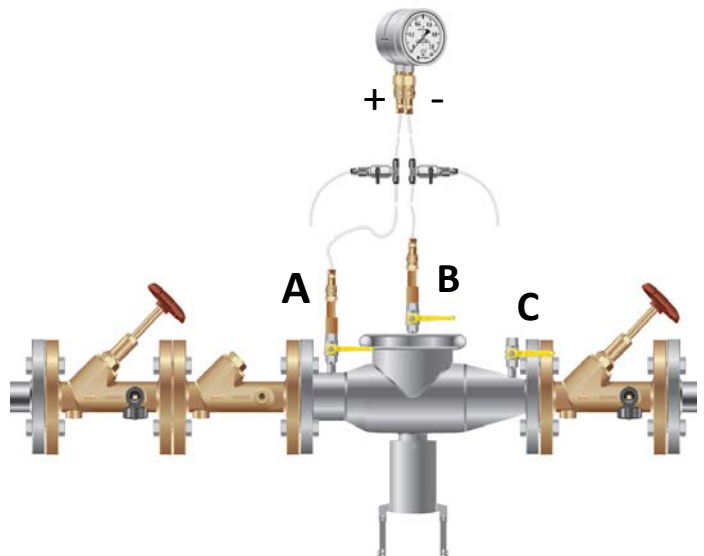
5.2 Preparing the differential pressure manometer

- Connect the test hose with the adapter *+* and *-* of the differential pressure manometer to each side.



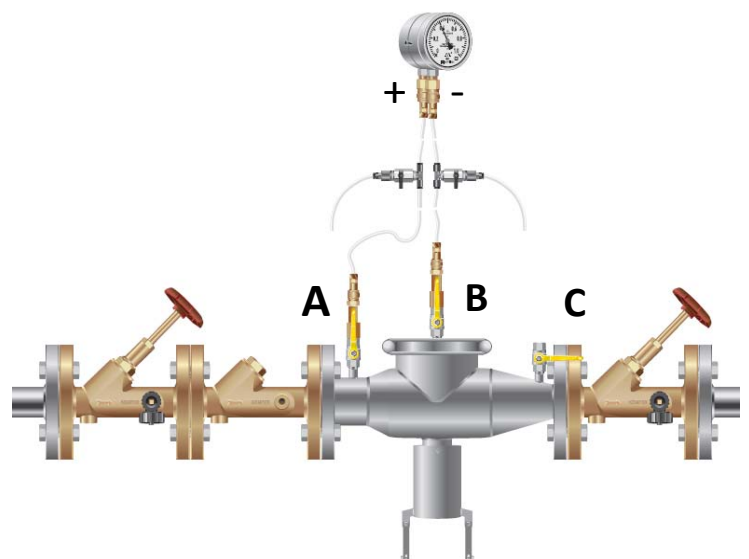
5.3 Connect differential pressure manometer for function test inlet anti-pollution check-valve an

- For each test hose, plug on and latch a quick coupler to the adapter (bleeder valves must be closed on the hoses.)
- Connect the test hose of Test valve A to the connection marked ``+`` on the differential pressure manometer.
- Connect the test hose of Test valve B to the connection marked ``-`` on the differential pressure manometer.
- A = Supply pressure zone, B = Middle pressure zone, C = Back pressure zone

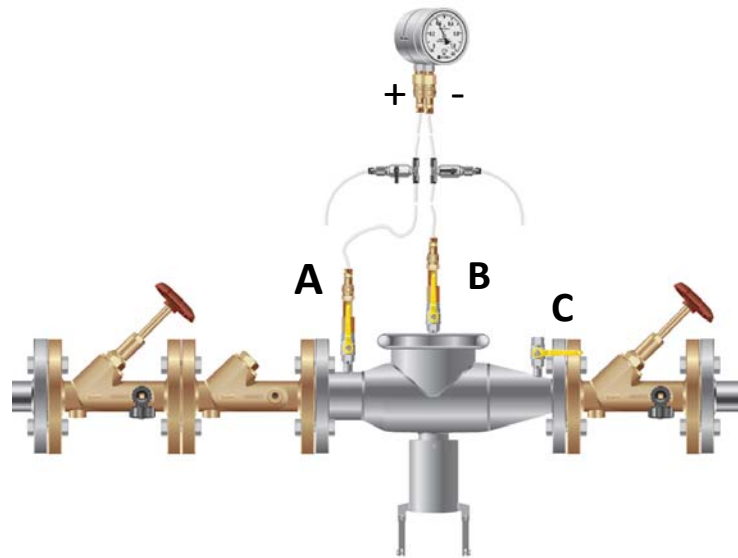


5.4 Function test, inlet anti-pollution check-valve

- Connect measuring instrument as per 4.3
- Open Test valves A and B and vent the measurement lines through the bleeder valves on the test hoses. Then close the bleeder valves and leave Test valve A and B open.

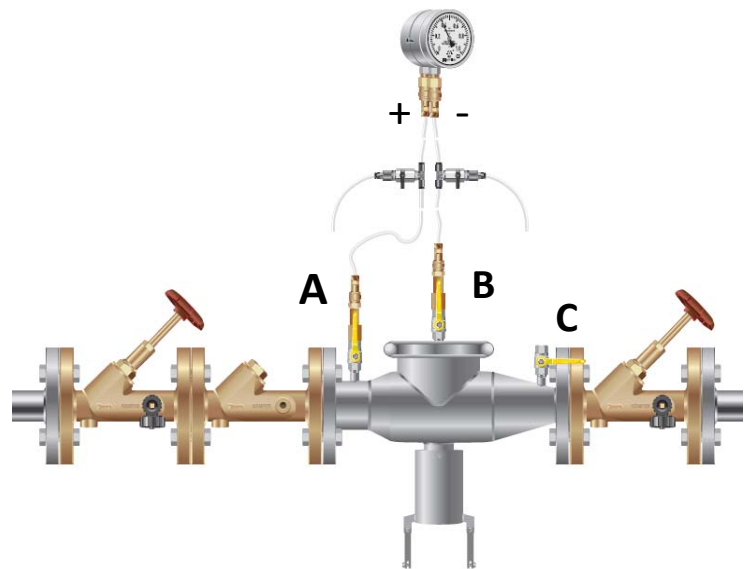


- Close the stop valve before and after the valve.
 - Using the bleeder valve on the test hose (Test valve B), slowly bleed the pressure of the middle pressure zone and watch the differential pressure display at the same time. **The differential pressure rises until the anti-pollution check-valve starts to open. The drain valve must not trigger during this.**
 - Close the bleeder valve on the test hose (Test hose B). **The differential pressure must remain constant.**
- Note: During the measurement, it is mandatory that there is no flow in the backflow preventer BA!**

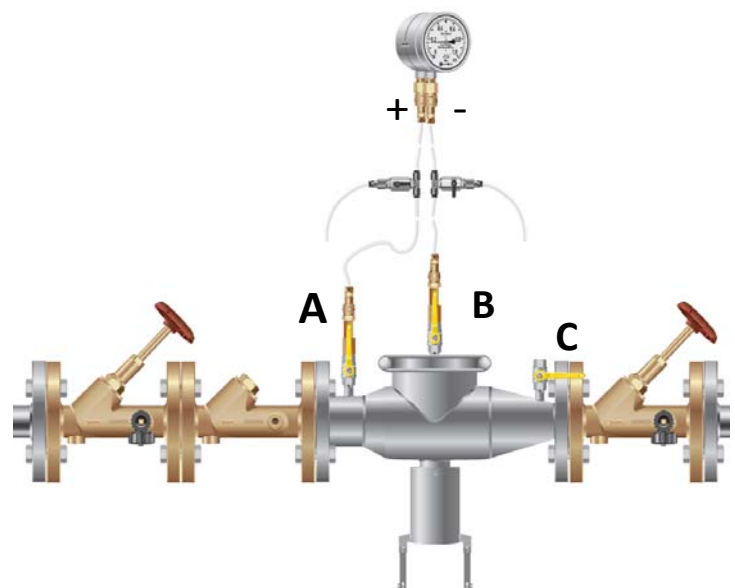


5.5 Function test, drain valve

- Connect measuring instrument as per 4.3
- Open Test valves A and B and vent the measurement lines through the bleeder valves on the test hoses. Then close the bleeder valves and leave Test valve A and B open.

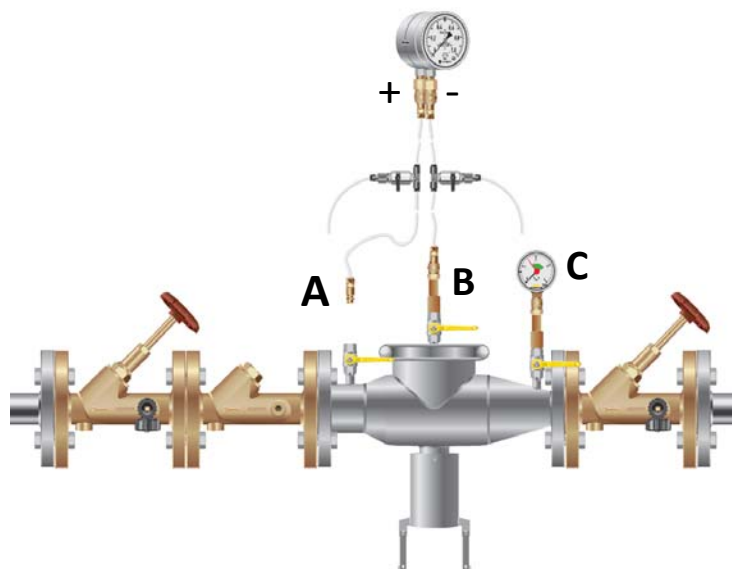


- Close stop valve before and after the valve
- Using the bleeder valve on the test hose (Test valve A), slowly bleed the supply pressure of the supply pressure zone and watch the differential pressure display and drain valve at the same time. **The drain valve must trigger before the display reaches the value 140 mbar (when the valve triggers, the differential pressure initially rises only slightly and then falls again)!**
- Close bleeder valve. The bleeder valve must be closed tightly again.



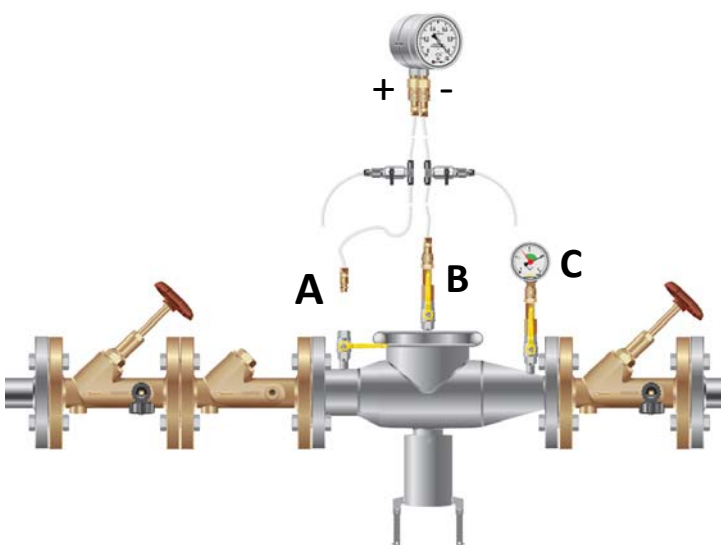
5.6 Connect differential pressure manometer and absolute pressure manometer for function test output anti-pollution check-valve

- Connect the test hose from Test valve B to the connection marked "-" on the differential pressure manometer.
- Connect absolute pressure manometer with adapter to Test valve C.

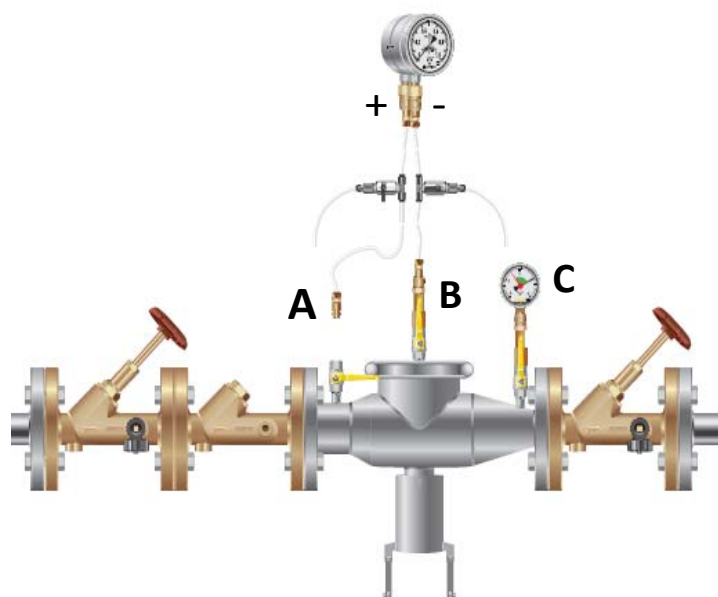


5.7 Function test, outlet anti-pollution check-valve

- Open the stop valve before and after the valve and fill the valve.
- Read pressure on scale and write down the value.



- Close stop valves and use Test valve B and Bleeder valve B to depressurise the middle pressure zone. During this, it is possible that a slight pressure drop occurs on the scale due to "setting".
- Wait at least 2 minutes. The outlet-side anti-pollution check-valve is leakproof when the pressure remains constant during this time.



6. Removal, installation and cleaning the drain valve

Both anti-pollution check-valves and the drain valve can be removed for maintenance purposes. All work can be performed without removing the housing from the pipeline (inline service). Only authorised specialists are allowed to perform maintenance.

1. Close cut-off valves 1 and 2.
2. Reduce the pressure by opening the ball valves.
3. Unscrew pressure control line 14 on the drain valve.
4. After loosening the screws, pull down drain connection 7 and unscrew with the help of an oil filter strap.
5. Take off the drain valve.
6. If necessary, clean or replace.
 - If no dirt particles are visible but a fault was observed while inspecting the drain valve (see Chapter 5.2), the drain valve should be replaced (see accessories/spare parts).
 - Clean the area around the valve seat and the opening slot (e.g., by carefully blowing out)
7. Assemble in the reverse sequence.
 - Grease the O-rings well with Unisilikon 250 or a grease that does not contain mineral oil. **ATTENTION!** Otherwise it is possible that the O-rings will be destroyed.
 - Replace damaged O-rings, see Chapter 13, Spare parts
8. Close the ball valves.
9. Slowly open the cut-off valves.
10. Vent the system through the ball valves.
11. Check the drain valve, see Chapter 5.2.
12. Connect the dust plugs to the ball valves.



Never dismantle the anti-pollution check valve and drain valve from each other. High danger of injury!

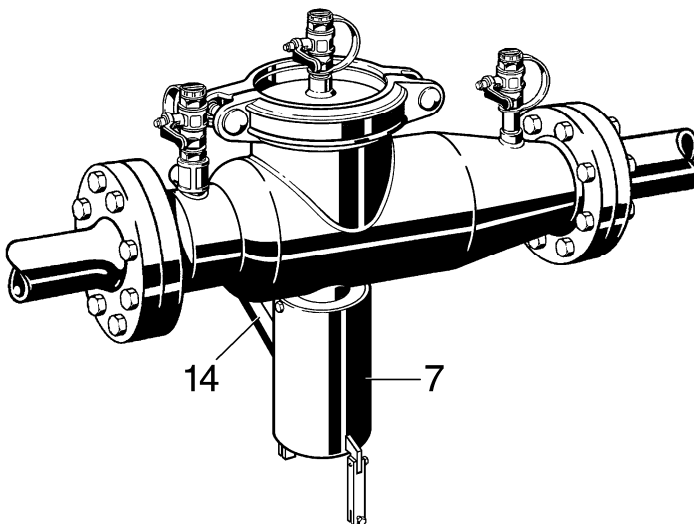


Figure 7: Removal, installation and cleaning the drain valve

6.1 Removal, installation and inspecting the anti-pollution check valve (refer to Figure 4)

1. Close cut-off valves 1 and 2.
2. Reduce pressure by opening ball valves 3, 4, and 5.
3. Take off cover.
4. Remove the anti-pollution check-valve.
 - For DN 65-150: first unscrew the discharge anti-pollution check valve and then the supply anti-pollution check valve. You can obtain an assembly tool as an accessory.



Danger of injury! The anti-pollution check-valve is spring preloaded.

5. Check for leakproofness by filling water from the rear.
 - Leaky anti-pollution check-valves must be replaced. Repair is not possible.
6. Assemble in the reverse sequence.
 - For DN 65-150: - grease O-ring and thread well on the anti-pollution check valve with Unisilikon 250.
 - Do not damage the O-ring when installing.
 - The tightening torque for the anti-pollution check-valve is 100-120 Nm.
7. Close the ball valves.
8. Open the cut-off valves.
9. Vent the system through the ball valves.
10. Check the backflow preventer, see Chapters 5.1 to 5.3.
11. Connect the dust plugs to the ball valves.

7. Important information instructions for your safety

Use the device solely in a technically flawless condition and as intended for use, safety and hazard aware while complying with the installation and operating instructions. Have all malfunctions that could impair safety repaired immediately.

The BA Backflow Preventer, Figure 361, is intended solely for the application areas named in these installation and operating instructions. Any different use or use beyond and above that is considered non-intended usage.

8. Troubleshooting

Errors	Possible causes	Remedy
Other	Strong pressure fluctuations in the water network.	Install a water surge (hammer) damper behind the backflow preventer
	Fluctuating admission pressure	Install a pressure reducer before the backflow preventer
	Supply-side anti-pollution check valve or drain valve is soiled	Remove and clean anti-pollution check valve
	Leaky supply anti-pollution check valve	Remove the anti-pollution check valve
Drain valve does not close	Deposits on the valve seat	Remove the drain valve
	Damaged O-rings	Remove drain valve and replace O-ring
	Leaky drain valve	Remove the drain valve
Drain valve does not open	Clogged pressure control line	Remove and clean the pressure control line

Table 4: Troubleshooting

9. Technical data

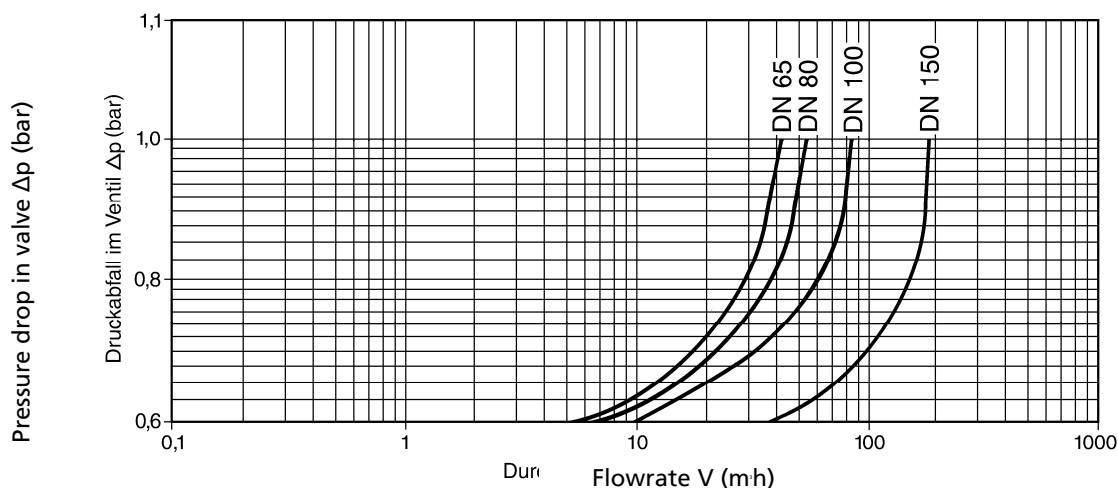
Total pressure drop:	max. 1.0 bar at nominal flow
Flow media:	Water at 60 °C
Operating pressure:	max. 10 bar
Minimum supply pressure:	1.5 bar
Ball valve connection:	G ½ with connection size DN 65-150

Connection sizes	Weight ca. in kg	Total length in mm	Nominal flow rate in m³/h
DN 65	32	559	45
DN 80	32.5	559	54
DN 100	33	559	85
DN 150	57	695	191

Table 5: Technical data

10. Flow diagram

Connection sizes DN 65 to 150



11. Materials

Housing	Stainless steel
Anti-pollution check-valve	Stainless steel
Other interior parts	Stainless steel
Compression spring	Stainless steel
Sealing disc	EPDM
Drain valve housing	Stainless steel
Drain valve, other interior parts	POM
Drain valve, compressed spring	Stainless steel
Drain valve, membrane	EPDM
Drain valve, sealing disc	EPDM
Drain valve	Stainless steel

Table 6: Materials

12. Accessories

KEMPER differential pressure measuring case

Differential pressure manometer in a representative aluminium case, ideal for inspecting and maintaining all KEMPER BA Backflow Preventers, Figures 360 and 361

Content of the Differential Pressure Measurement Kit, Figure 360 99



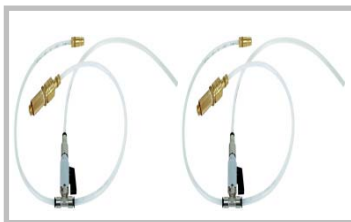
2 G1/4 adapters with plug coupling



2 G1/2 and G1/4 adapters



Differential pressure manometer with scale range to 1 bar



2 test hoses, preassembled with plug-and-socket connections and bleed valves



1 absolute pressure manometer with scale range to 10 bar

Replacement tools for anti-pollution check-valve

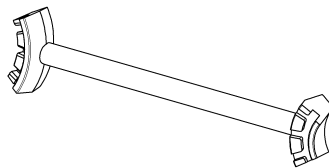
For flange version DN 65-100

For flange version DN 150

Assembly wrench

DN 65-DN 100 Figure 361 99 009

DN 150 Figure 361 99 010

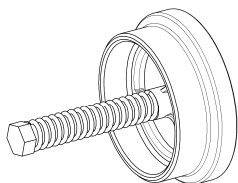


13. Spare parts

Anti-pollution check valve, supply side

DN 65 – DN 100 Figure 361 98 002,

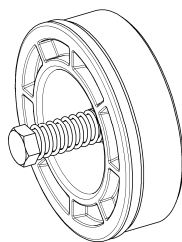
DN 150 Figure 361 98 006 010



Anti-pollution check valve, discharge side

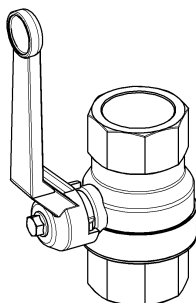
DN 65 - DN 100 Figure 361 98 003,

DN 150 Figure 361 98 007



Ball valve

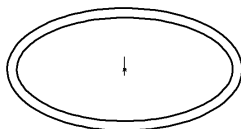
DN 65 - DN 150 Figure 361 99 004



Gasket set

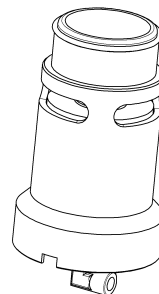
DN 65 – DN 100 Figure 361 99 005

DN 150 Figure 361 99 008



Bleed valve

DN 65 – DN 150 Figure 361 98 001



Appendix 1: Inspection and maintenance for backflow preventer BA, DIN EN 1717

Backflow preventer BA Type:		FILL IN AFTER STUDYING THE INSTALLATION AND OPERATING INSTRUCTIONS											
Year	1	Inspection	/	Maintenance	2	Inspection	/	Maintenance	3	Inspection	/	Maintenance	
	Date:			Date:		Date:		Date:		Date:		Date:	
	Company:			Company:		Company:		Company:		Company:		Company:	
	Tester:			Tester:		Tester:		Tester:		Tester:		Tester:	
Inspection	Accessibility of the protection valves	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
	Visual inspection of the leak tightness of the connection of the stop valves and check the dirt trap	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
	Check the drain	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
	Fluid in the odour trap	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
Maintenance	Clean the dirt trap	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
	Static pressure / Flow pressure / Differential pressure		/	/	mbar		/	/	mbar		/	/	mbar
	Function test, inlet anti-pollution check-valve	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
	Function test drain valve	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
	Function test, outlet anti-pollution check-valve	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	
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